Metals Laboratory Sampling Guide

Description

The following procedures provide step by step instruction on sampling all materials required to be tested by the Michigan Department of Transportation Metals Laboratory.

Sampling Instructions

1. Samples must be selected randomly without bias, must be representative of the material sampled, and can only represent the population of material available at the time of sampling (e.g. makeup material must be resampled since the original sample cannot statistically represent material not available at the time of sampling). Specific sample size and frequency can be found in the Materials Acceptance Requirements table located in the MDOT Materials Quality Assurance Procedures Manual.
2. All samples must be securely tagged with a numbered zip tie. Zip ties are provided by MDOT and are uniquely numbered for sample identification purposes. High strength bolt samples must be placed in plastic bags and closed with zip ties. All other samples must have zip ties placed directly on the sample.
3. Population of material sampled must be tagged or marked in accordance with subsection 1.08 of the MDOT Materials Quality Assurance Procedures (MQAP) Manual.
4. Sample Identification (Form 1923) must be electronically prepared and filled out in detail for each sample, placing the zip tie number in the remarks section. All available information for proper identification of the sample must be provided, including the heat number, lot number, tag number, batch number, serial number, and any other unique identification marks.
5. All material documentation for the sample must be electronically combined with Form 1923 as the first page into one Adobe portable document format (PDF) file (naming convention in #6 below) and submitted to the testing lab via email to MDOT-MetalsLab@michigan.gov. If the MDOT Standard Specifications for Construction do not apply to the sample, applicable plan sheets, special provisions or shop drawings must be included in the PDF submittal. The email must have the zip tie number in the subject line. The Contractor is responsible for providing all material certification and test data reports to the MDOT inspector in PDF format.
6. Materials Submittal File Naming Conventions:
    - Acceptance Sample: Control Section_Job Number_Material_Size_Date
      Example: 63172 123143 Anchor Bolt 2in 07-09-2018
    - Tested Stock Sample: TS_Material_Size_Date
      Example: TS Extruded 12in 07-09-2018
    - Certification Verification Sample: CV_CV Number_Material_Size_Date
      Example: CV 2015-31 Rebar #5 07-09-2018
    - A glossary of standard material names is included on page 3 of this document.
    - A Lab Number will be assigned by the Metals Lab and incorporated into file name.
      Example: 18M123 63172 123143 Anchor Bolt 2in 07-09-18

7. Form 1923 must be securely attached to the sample using a method which would ensure the form remains with the sample and is readable when it arrives at the testing lab.
8. The method of transportation of the samples to the testing lab is at the discretion of the Contractor. The Contractor is responsible for all associated shipping costs and must determine shipment method in a manner deemed most appropriate. Non-MDOT employees dropping off samples must check in with security at the loading dock gate or south entrance of the C&T building prior to dropping samples off to the Metals Laboratory.
9. All samples must be consigned to:

    Michigan Department of Transportation
    Metals Lab
    Construction & Technology Building
    8885 Ricks Road
    Lansing, MI 48909

10. Test results can typically be expected within 2 weeks after the sample arrives in the testing lab. Inquiries regarding test results may be directed to MDOT-MetalsLab@michigan.gov.

11. Metals Lab will place test reports into the ProjectWise MDOT In Box folder at the location shown below. The Engineer will then place the report in the appropriate project folder.
    - Region
        - TSC
            - Project Specific JN
                - Construction
                    - MDOT In Box

Glossary of Materials Tested by the MDOT Metals Laboratory

Spec Reference	Material Name	*File Name
712.03.L	Mechanical Splicing	Splice
713.02.A	Temporary Support Hanger Rod	Hanger Rod
905.03	Rebar	Rebar
905.06	Welded Wire Fabric	Welded Wire
905.07	Prestressing Strand	Prestressing Strand
906.07	High Strength Bolts	HS Bolt
907.05	High Tensile Wire	Tensile Wire
908.09.A	Bridge Rail Post	Rail Post
908.09.A	Bridge Rail Plate	Rail Plate
908.09.B	Bridge Tube Railing	Bridge Tube
908.09.C	Railing Anchor Studs	Anchor Stud
908.11.A	Guardrail Beam	Guardrail
908.12	Guardrail Post	Guardrail Post
908.14	Anchor Base Plate	Base Plate
908.14.B	Sign Support and Light Standard Anchor Bolts	Anchor Bolt
908.14.C	Traffic Signal Strain Poles	Strain Poles
908.14.D	Anchor Bolts for Other Purposes	Anchor Other
909.05.A.1	Corrugated Steel Pipe	Corrugated
914.07	Dowel Bars	Dowel
918.11.A	Guy Wire	Guy Wire
919.02.A	Extruded Aluminum Sign Planks	Extruded Aluminum
919.02.A.3	Aluminum Sheet	Aluminum Sheet
919.07.A	Cantilever Pipe	Wall Tubing

* This is to be used as the naming convention to save the file.

SampleManager login instructions (you must have a login name and password):

1. Open up Sample ID and certification paperwork.
2. In SampleManager, click on "MDOT/Sample Submission" and then pick sample type.
3. Click on "Contract" button to pull up list of job numbers to pick one.
4. Click on "Metals" radio button.
5. Click on pulldown labeled "Material" to pick type of material.
6. Click on "Spec Level" in order to pick size of sample.
7. If remarks are needed, enter them in the "Remarks" box.
8. If needed, under "Send Results To" you can pick a person and reason for sending results.
9. Click "OK" to go to the next page for sample details.
10. Click on "Date Sampled" to pick the dates sampled. You can type it in or pick from the calendar.
11. Pick the "Supplier" from the dropdown list.
12. Pick a location from the "Sampled From" list.
13. Put in a number for "Quantity Represented", this usually comes from the Materials Source List.
14. If needed, pick "Quantity Units" from the list.
15. Pick the "Sampled By" person from the dropdown list.
16. Pick the "Submitted By" person from the dropdown list.
17. Fill in the zip tie tag number or deer tag number.
18. If applicable, pick the "Manufacturer" of the bolt, nut and washer.
19. Also fill out the lot and heat numbers of the bolt nut and washer. If one component is not present, pick "Not Supplied" as the manufacturer name from the dropdown list. Use the certifications to find lot and heat numbers.
20. If applicable, also attempt to identify the products markings and enter these. Common manufacturer's markings are listed following this page.

Note: You can view logged samples by expanding the "Metals Lab" icon at the left of SampleManager. From there you will see different folders showing the state of testing for the samples. Also, if a company or employee needs to be added to SampleManager or you have login questions, please email:

MDOT-MetalsLab@michigan.gov

You can find SampleManager training videos on the MDOT YouTube page or they are available by request.

Metals Product Markings

Product, spec book section and ASTM	Required markings	Commonly seen markings (and manufacturer)
Temporary Support Hanger Rod 712.02A, ASTM A193	15.1 See Specification A962/A962M. The grade symbol shall be as shown in Table 4. From Table 4: B7	
Rebar 905.03, A706, A615	16.2 Each manufacturer shall identify the symbols of his marking system. For Grade 60 [420] bars, the marking shall be either the number 60 [4] or a single continuous longitudinal line through at least five spaces offset from the center of the bar. For Grade 80 [550] bars, the marking shall be either the number 80 [6] or three continuous longitudinal lines through at least five spaces.	See rebar markings list below (Appendix A). *If rebar is coated, then coating company is the manufacturer (ABC Coating Co.)
High Strength Bolts 906.07, ASTM F3125 grade A325	From Table 1: A325 5.1 At a minimum, all bolts shall be marked as required in Table 1. Marking shall be on the bolt head and may be raised or depressed at the manufacturer's option. The marking shall be visible after coating. 5.2 Grade and Type marking, and the manufacturer's mark shall be in separate and distinct locations on the head. Other markings, if used, such as private label distributor's mark shall also be separate and distinct.	nA325 (Nucor) SLA325 (St. Louis Screw & Bolt) SLA325USA (St. Louis Screw & Bolt) GA325 (Gaffney Bolt Co.)
Nuts 906.07, 908.14, ASTM A563 gr. DH or ASTM A194 gr. 2H	14.5 Nuts made to the requirements of Grade DH shall be marked with the grade symbol, DH (or 2H) (Note 4) on one face. 14.7 In addition, nuts shall be marked with a symbol to identify the manufacturer or private label distributor, as appropriate.	DHU (Unytite) Dhn (Nucor) 2HU (Unytite) DHn (Nucor) TDC2H (Dyson) 2HDHD/N (Dyson) DMCDH (Dyson) FSADH/2H (Foundation Systems)
Washers 906.07, 908.14 ASTM F436	15.1 Washers shall be marked with a symbol, or other distinguishing marks, to identify the manufacturer or private label distributor, as appropriate.	TSIF436 (Technical Stamping) PF436 (Prestige Stamping) Ws (Wrought Washer)

Product, spec book section and ASTM	Required markings	Commonly seen markings (and manufacturer)
Anchor Bolts 908.14 ASTM F1554, grade 55 and 105	19.1 Unless otherwise specified (see Note 4), the end of each anchor bolt intended to project from the concrete shall be color coded to identify the grade as follows: Grade 36 Blue, grade 55 Yellow, grade 105 Red. **S2. (not required by spec but informational)** S2.1 The end of the anchor bolt intended to project from the concrete shall be steel die stamped with the manufacturer's identification.	AVA 55 (AA Anchor Bolt) ASI 55 (Alton Steel) 27 ("XX") (Gerdau Ameristeel) S41 ("XXX") (Cardinal Fabricating) FSA105 (Foundation Systems)
Bridge Tube Railing 908.09B, ASTM A500 grade B	908.09B The manufacturer of the structural shape must identify the product as follows: 1. Place identification before galvanizing; 2. Include heat number or other code traceable to the heat number; 3. Include manufacturer's unique identification code; 4. Place identification on only one section face; 5. Repeat identification a no more than 4-foot intervals; 6. Do not extend identification into the curved surface at corners of section; and 7. Do not place identification on side facing traffic or side opposite traffic.	BMT U65 (Bull Moose Tubing)
Railing Anchor Studs 908.09C, ASTM A449	16.1 *Manufacturers Identification*—All hex cap screws and bolts and one end of studs ⅜ in. and larger, and whenever feasible studs smaller than ⅜ in., shall be marked by the manufacturer with a unique identifier to identify the manufacturer or private label distributor, as appropriate. 16.2.1 Type 1 hex cap screws and bolts and one end of Type 1 studs ⅜ in. and larger, and whenever feasible studs smaller than ⅜ in., shall be marked "A449."	BFA449 (Birmingham Fastener) SLA449 (St. Louis Screw & Bolt) JHBA449 (J.H. Botts)
Guardrail Beam 908.11A, AASHTO M180	11.1 Each beam element shall be identified by the following: Name or brand of manufacturer, identification symbols or code for heat, number and coating lot, AASHTO specification number, and class and type.	